

## HOW I DO IT

# Modified Hemipelvectomy

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### INTRODUCTION

The operation of hemipelvectomy for malignant disease of the pelvis and upper thigh is an acceptable operation, either as a curative or palliative procedure. Our experience with more than 300 operations performed from 1957 to 1990 permits us to present our surgical technique.

Several variants of hemipelvectomy have been described. The advantage of the so-called modified hemipelvectomy is that it is not as traumatic an operation as the typical procedure, since it is not necessary to disinsert the iliac insertion of the quadratus lumborum and abdominal muscles, and it eliminates cutting the sacroiliac synchondrosis, perhaps the most laborious and shocking part of the typical operation.

### SURGICAL TECHNIQUE

#### Patient Position and Skin Incision

The patient is secured to the table in an oblique position with pads anterior and posterior to the torso and thorax and fixed to the operation table with a wide strip of adhesive tape. The opposite lower extremity, which has been previously covered by an elastic bandage, is also fixed to the operating table to permit the table to be freely moved for a comfortable position for the surgeon (Fig. 1).

Anteriorly, the incision is made over the inguinal ligament, from the pubic tubercle to just above the anterior superior iliac spine, then curves back and down from the spine toward the greater trochanter to continue posterior just below the buttock crease and medial side of the thigh to meet the inner end of the anterior incision in the pubic region. However, it is our practice not to make the posterior part of the incision until the later part of the operation, since most of it can be done from the anterior aspect (Fig. 2).

#### Exposure of Retroperitoneal Space

Once the anterior incision is deepened to the fascia, a short abdominal skin flap is dissected. The inguinal canal

is incised from the external inguinal ring to the point where the round ligament or the spermatic cord dips downward into the pelvic cavity. At this point, the spermatic cord is mobilized and protected while the round ligament in the female may be simply ligated and divided.

The inguinal canal is further exposed laterally by incising the external oblique fascia and the transversalis muscle until just above the anterior superior iliac spine. Following the division of these structures the protruding preperitoneal fat is swept upward with a wide Deaver retractor, exposing the deep epigastric vessels and the ureter crossing the iliac artery.

To secure even greater exposure of the retroperitoneal space, we have found it very useful to serve the rectus abdominis muscle from its insertion in the upper border of the pubis. This maneuver is easily performed with a curved scissors, the assistant retracting the cord medially and the surgeon protecting the bladder by pushing it backward with the left hand. The peritoneal cavity is not normally entered unless exploration of the abdomen is mandatory.

We start the retroperitoneal step by doubly linking and transecting either the primitive or the external iliac artery and vein just below its bifurcation.

Some surgeons have stressed that ligation of the common iliac artery, by controlling the circulation of the hypogastric, obturator, gluteal, and internal pudendal arteries, may minimize the blood supply to the posterior flap and ischemic necrosis may develop. However, in a large number of our cases in which the common artery was ligated, necrosis never developed.

#### Transection of the Psoas and Iliac Muscles

After the vascular supply has been ligated, the psoas and iliac muscle are dissected by blunt and sharp dissec-

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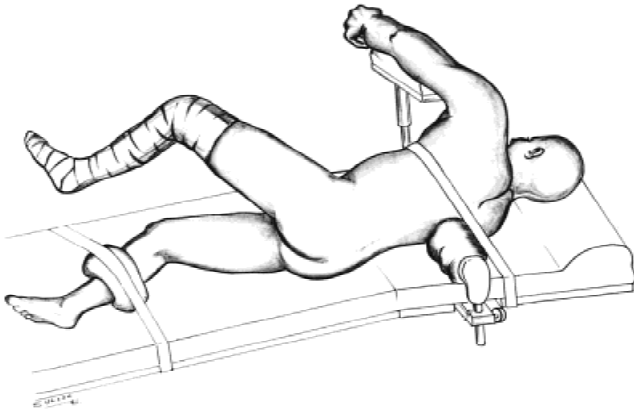


Fig. 1. The Patient lies in the oblique position secured to the operating table to permit the table to be freely moved.

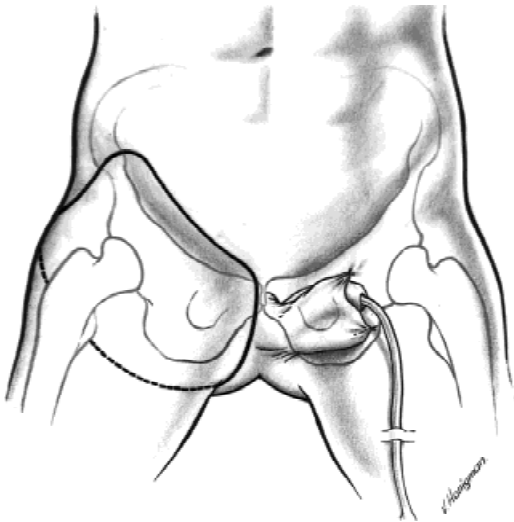


Fig. 2. Outline of the skin incision in the anterior aspect of the lower abdomen parallel to the inguinal ligaments and the posterior aspect of the thigh.

tion, which is accomplished by placing the fingers between the posterior aspects of the psoas and iliac muscle and the bone. This maneuver facilitates the transection of these structures, thus exposing the greater sciatic foramen through which the pelvis cavity is put into communication with the gluteal region (Fig. 3).

### Section of the Pubis

At this time, the iliac fossa is packed with moist pads and the next step is the section of the pubis symphysis, which is exposed by retracting the medial end of the incision to the opposite side or extending the incision to the contralateral pubis. The symphysis is located more by palpation than by visualization. Once the tubercles of the pubis are palpated, a long curved forceps (a Crafoord forceps with fine point is ideal) is passed just below the inferior border of the pubis through the suspensory liga-

ment of the penis in the male and the suspensory ligament of the clitoris in the female, which facilitates passing the Gigli saw to divide the symphysis. Special care should be observed to protect the bladder by pushing down with the other hand.

Bleeding usually occurs following severance of the symphysis pubis, thus any effort to control the hemorrhage is unnecessary. In our experience, it is best to pack the space between the symphysis with a moist gauze and to continue with the operation.

### Section of the Iliac Bone and Gluteal Muscles

At this point, we are ready for the division of the bony structure of the iliac bone. This is begun by extending the lateral end of the initial skin incision back and down and posteriorly over the buttock to join the medial end of the anterior incision as described above. After the gluteal region is exposed by dissecting a gluteal skin flap, a Crafoord long curved forceps is passed blindly from the pelvis to the gluteal region through the greater sciatic foramen, which permits easy passing of a Gigli saw to transect the gluteous muscles and iliac bone (Fig. 3).

It is not necessary to skeletonize the crest of the ileum disinserting the dorsal and quadratus lumborum muscle as is required in the classical hemipelvectomy. The extension of the iliac bone to be resected depends on the requirements of the case and can be accomplished by the angulation we give to the Gigli saw.

Bleeding from the gluteal arteries is controlled by clamping and ligation, and bone bleeding is controlled with bone wax. After bleeding is controlled, transection of the piriformis, gemelli, obturator internus, levator muscles, and sciatic nerve is next performed and a rather thick flap is developed posteriorly which is much longer than the anterior.

After the specimen has been removed absolute hemostasis is obtained, especially around the prostate or urethra, which earlier seemed difficult to control because of its location but which now is easily accessible. The posterior flap is now tailored by removing redundant skin. The wound is closed in separate layers with interrupted sutures, and two perforated plastic catheters under negative pressure are placed at each angle of the wound and the edges of the posterior flap are approximated to those of the abdominal wall.

### COMMENTARY

The article by Cáceres and Leon describes well the procedure of hemipelvectomy. The version they describe as "modified hemipelvectomy" has been called "conservative hemipelvectomy" in the United States as it preserves a portion of the iliac crest and posterior portion of the iliac bone for tumors that do not extend cephalad, i.e., toward the sacroiliac joint [1,2].

The anterior portion of the incision is outlined well by

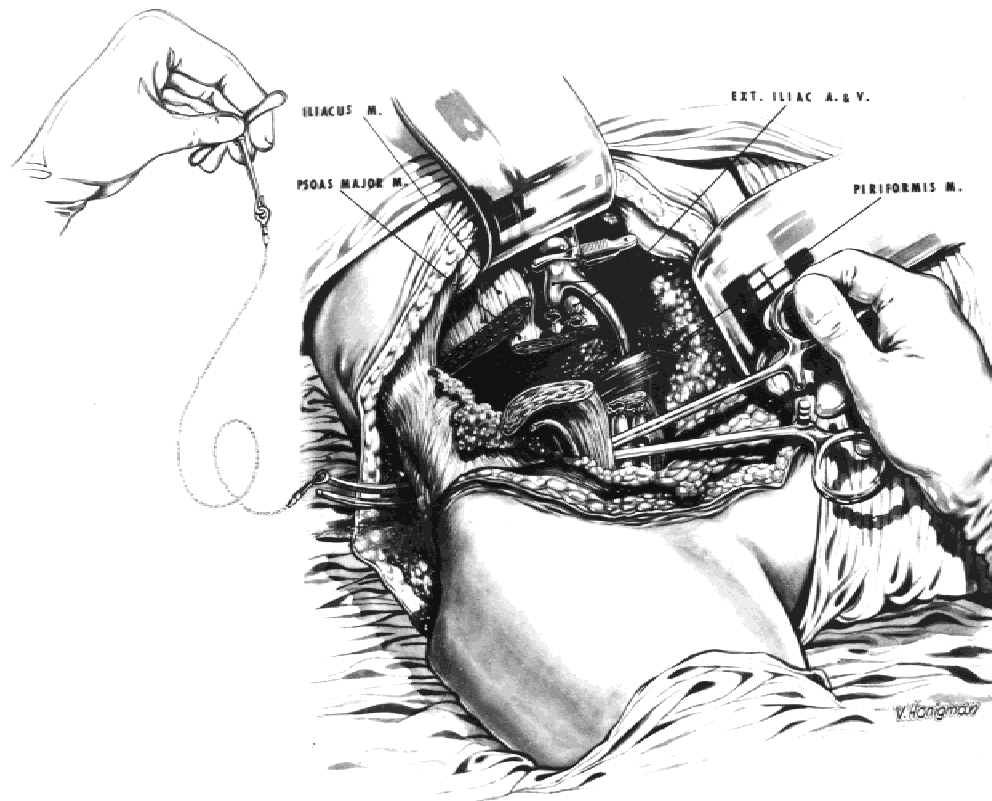


Fig. 3. After the iliac vessels are transected and ligated and the iliopsoas muscle is served, a Crafoord long curved forceps is passed through the greater sciatic foramen, putting the pelvis cavity into communication with the gluteal region and permitting easy passing of a Gigli saw to transect the gluteous muscles and iliac bone.

the authors and by following the course of the inguinal canal illustrates the technique of preserving the ipsilateral spermatic cord and testicle whenever these structures are not involved. The posterior incision appears to be a little high in the drawing. This reviewer makes the posterior incision 5–10 cm below the greater trochanter on the posterior thigh. It is always easier to trim a redundant flap than to have too short of a flap. As the authors note in their article, some clinicians have speculated that ligation of the common iliac vessels (as opposed to the external iliac vessels) may be more prone to lead to posterior flap necrosis by depriving blood supply normally provided by branches of the internal iliac vessels. This complication has been reported in the past to occur in 60–80% of patients. However, it has been demonstrated conclusively that leaving the gluteus maximus attached to the posterior flap is the only necessary and adequate condition in preserving the viability of the posterior flap, regardless of the level of ligation of the iliac vessels; apparently, the small blood vessels from the edge of the sacrum at the origin of the gluteus maximus provide adequate circulation to the posterior flap [3,4].

Modifications of hemipelvectomy are 1) a transperitoneal procedure with or without combination with a lower

midline incision for large proximal tumors or after radiation causing fusion of the peritoneum to the anterior abdominal wall, 2) en bloc removal of involved pelvic organs (compound hemipelvectomy), 3) anterior flap hemipelvectomy, and 4) internal hemipelvectomy [5,6].

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